

Engineering Data

Stromberg-Carlson No. 370 Radio Receivers

STROMBERG-CARLSON TELEPHONE MANUFACTURING COMPANY
ROCHESTER, NEW YORK

ELECTRICAL SPECIFICATIONS

| | |
|-------------------------------------|---|
| Type of Circuit | Superheterodyne with A. F. C. Electric Tuning |
| Tuning Ranges | A—530 to 1600 Kc.; B—1600 to 4800 Kc.; C—4800 to 11,000 Kc.; D—11,000 to 22,000 Kc. |
| Number and Type of Tubes | { 3 No. 6K7, 1 No. 6A8, 1 No. 6F8-G, 2 No. 6H6, 1 No. 6R7, 1 No. 6F5, 1 No. 6C5, 2 No. 6L6, 1 No. 6U5, 1 No. 5Z3 for 50 to 60 Cycles, or 1 No. 5T4 for 25 to 60 Cycles |
| Voltage Rating | 105 to 125 Volts, A. C. |
| Power Frequency Rating | See "Apparatus Specifications" |
| Input Power Rating | 155 Watts |
| Frequency of Intermediate Amplifier | 455 Kilocycles |

APPARATUS SPECIFICATIONS

| | |
|---------------------|---|
| No. 370-M Receiver | 50 to 60 Cycles; P-29070 Chassis; P-29072 Speaker |
| No. 370-MB Receiver | 25 to 60 Cycles; P-29071 Chassis; P-29072 Speaker |

CIRCUIT DESCRIPTION

The Stromberg-Carlson No. 370 Radio Receivers are fourteen tube, "Electric Tuning", adjustable high fidelity receivers with four tuning ranges. The electric tuning circuit combines a highly efficient motor and selector circuit in combination with an automatic frequency control circuit. The electric tuning circuit is arranged so that eight favorite stations located in the Standard Broadcast range may be set up for selection by means of the push buttons (local and other stations that give the best daytime and evening service should be selected). To properly set up the electric tuning arrangement for the eight favorite broadcast stations, read the section, "Instructions for Setting Up Electric Tuning Arrangement" appearing on page 6 of this book.

When manually tuning these receivers or when setting up the eight desired stations for electric tuning, resonance with a signal is indicated by means of the tuning indicator tube which operates on the cathode-ray principle. The strength of a received signal may be determined by observing the size of the aperture appearing on the target of the tube; the stronger a received signal the greater the reduction in the size of the aperture.

These receivers are also provided with a low level bass frequency compensating circuit in conjunction with the volume control circuit so that balanced reproduction is obtained for any setting of the volume control. A separate "Bass" control is also provided to increase or decrease the response at the lower (bass) audio frequencies if this is desired.

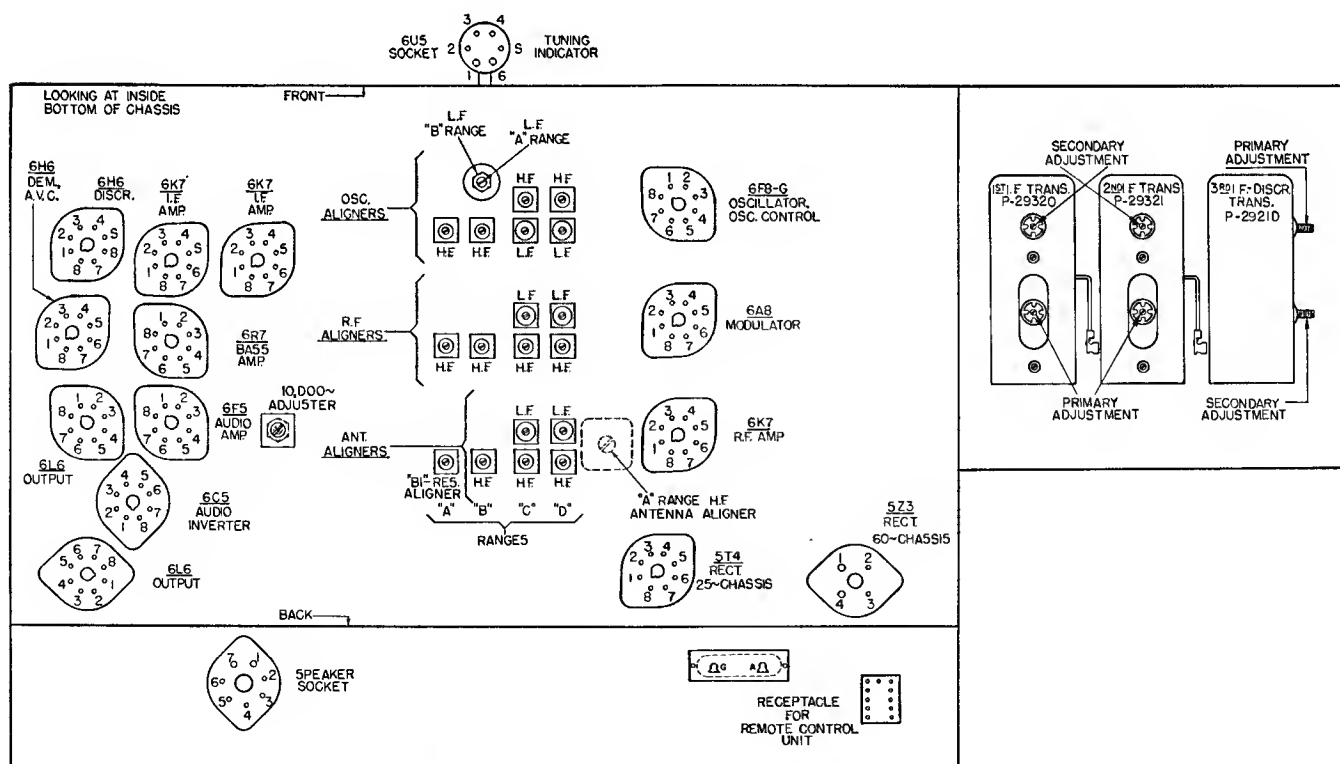


Fig. 1. Terminal Layout for Voltage Measurement Chart and Location of the Aligning Adjustments.

These receivers are also equipped with a special arrangement of the Stromberg-Carlson, Selector dial indicator. This design of dial arrangement enables the operator to easily identify the service and frequency range to which the range switch control knob is set by means of the yellow disc (located at the right-hand edge of the dial), which moves in a vertical direction in conjunction with the rotation of the range switch control knob.

The various tubes are used in these receivers as follows: One No. 6K7 is used in the R. F. Amplifier and the other two are used in the I. F. Amplifier. The No. 6A8 tube is used as the Modulator tube and the No. 6F8-G tube is used for both Oscillator and Oscillator Control tube. One No. 6H6 tube is used as the Demodulator and Automatic Volume Control tube and the other No. 6H6 tube is used in the Discriminator circuit for Automatic Frequency control. The No. 6R7 tube is used in the Bass Amplifier and the No. 6F5 tube is used in the Audio Amplifier. The No. 6C5 tube is used as the Phase Inverter tube of the Audio Amplifier circuit and the two No. 6L6 tubes are used in the Audio Power Output Stage. The No. 6U5 tube is used for indicating resonance in the Tuning Indicator System. The No. 5Z3 tube is the Rectifier tube of the power supply for these receivers designed for operation on a power supply having a frequency of 50 to 60 cycles; models of these receivers designed for operation on a power supply having a frequency of 25 to 60 cycles, use a No. 5T4 tube as the Rectifier tube of the power supply.

NORMAL VOLTAGE READINGS

The various values of voltages listed in the following table are obtained by measuring between the various tube socket contacts and the chassis base, with all the tubes in their respective sockets. The receiver is, therefore, in operation when the measurements are made. Figure 1, shows the terminal layout of the sockets with the proper terminal numbers.

Voltages are given for a line voltage of 120 volts, and allowance should be made for differences when the line voltage is higher or lower. A meter having a resistance of 1000 ohms per volt should be used for measuring the D. C. voltages. Voltage values shown are those obtained on the lowest possible scale of a meter having the following ranges: 0-2.5, 0-10, 0-100, 0-250, 0-500, 0-1000 volts.

| Tube | Circuit | Cap | Terminals of Sockets | | | | | | | | Heater Voltages Between Heater Terminals | |
|---------------------------|--------------------------------------|-----|----------------------|-----|-------|------|------|------|------|-----|--|-------|
| | | | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | Socket Terminal Numbers | Volts |
| 6K7 | R. F. Amp. | 0 | 0 | 0 | +235 | +95 | 0 | +95 | 6.2 | 0 | 2-7 | 6.2 |
| 6A8 | Modulator | 0 | 0 | 0 | +240 | +95 | -6.9 | +95 | 6.2 | 0 | 2-7 | 6.2 |
| 6F8-G | Oscillator and Oscillator Control | 0 | 0 | 6.2 | +150 | +8.5 | -6.9 | +165 | 0 | 0 | 2-7 | 6.2 |
| 6K7 | 1st I. F. Amp. | 0 | 0 | 0 | +235 | +95 | 0 | -2.6 | 6.2 | 0 | 2-7 | 6.2 |
| 6K7 | 2nd I. F. Amp. | 0 | 0 | 0 | +235 | +95 | 0 | -2 | 6.2 | 0 | 2-7 | 6.2 |
| 6H6 | Demodulator and A. V. C. | — | 0 | 0 | -0.25 | 0 | 0 | +240 | 6.2 | 0 | 2-7 | 6.2 |
| 6H6 | Discriminator | — | 0 | 0 | 0 | 0 | 0 | 0 | 6.2 | 0 | 2-7 | 6.2 |
| 6R7 | Bass Amp. | 0 | 0 | 0 | +170 | 0 | 0 | 0 | 6.2 | +8 | 2-7 | 6.2 |
| 6F5 | Audio Amp. | 0 | 0 | 0 | 0 | +110 | 0 | +15 | 6.2 | +16 | 2-7 | 6.2 |
| 6C5 | Audio Inv. | — | 0 | 0 | +120 | — | 0 | +240 | 6.2 | +5 | 2-7 | 6.2 |
| 6L6 | Audio Output | — | 0 | 0 | +310 | +320 | 0 | — | 6.2 | +23 | 2-7 | 6.2 |
| 6L6 | Audio Output | — | 0 | 0 | +310 | +320 | 0 | — | 6.2 | +23 | 2-7 | 6.2 |
| 6U5 | Tuning Ind. | — | 6.2 | +18 | -1.25 | +235 | -2.6 | 0 | — | — | 1-6 | 6.2 |
| 5Z3 | Rectifier | — | +425 | 400 | 400 | +425 | — | — | — | — | 1-4 | 4.6 |
| Speaker Socket | | — | +310 | 0 | 0 | +425 | +425 | — | +415 | — | | |
| Voltage Across Motor Wdg. | | | 20 AC | | | | | | | | | |

Receiver tuned manually to 1000 kc., no signal. A. C. voltages are indicated by italics.

ALIGNMENT DATA

All alignment adjustments are accurately made at the factory on these receivers, and ordinarily no readjustments are necessary. However, should it become necessary to make any readjustments, the procedure given in these instructions should be carefully followed. The preferred method of aligning these receivers is by the use of a suitable cathode ray oscillograph and frequency modulator unit in conjunction with the standard signal generator.

To accurately align circuits in these receivers, it is necessary to use a high grade signal generator capable of being modulated 30% and having an output voltage of at least 100,000 microvolts; it will also be necessary to have this output voltage controlled so that only a few microvolts may be fed into the receiver. In conjunction with the signal generator, a sensitive output meter should be used for determining the maximum signal voltage developed across the voice coil of the loud speaker. In addition to this equipment, it will be necessary when making a final adjustment of the "Discriminator" tuned circuit to use a high resistance voltmeter having a resistance of at least 1000 ohms per volt.

In order to make the aligning adjustments in an easy and satisfactory manner, it is recommended that the Stromberg-Carlson P-24608 aligning tool be used.

Before proceeding with the alignment of any circuits in these receivers, be sure that the Treble Control knob is set for the "Normal" position. The "Bass" control should also be set for the "Normal" position. In making any alignment adjustments always adjust the test oscillator's output voltage to the minimum value where a good alignment may still be obtained, except when specifically directed otherwise in these instructions. Figure 1 shows the location of all the aligning capacitors or adjustments for these receivers.

Dial Adjustment

Before aligning the circuits of these receivers, the tuning dial must be properly aligned to "track" with the gang tuning capacitors. To check whether the dial is set correctly with respect to the gang tuning capacitors, rotate the "Manual Stations" selector knob in a clockwise direction so that the gang tuning capacitors are set to their maximum capacity position. With the gang tuning capacitors at this position, the dial pointer should be centered over the two dial alignment marks located near the extreme right-hand edge of the dial. One of these marks is a vertical line located beneath the standard broadcast scale, and the other mark is a small triangle located beneath the short wave scale of the dial. If the dial pointer does not center over these two marks, the screw located at the bottom of the dial pointer assembly should be loosened so that the pointer can be centered over the two marks. When this has been accomplished the screw should be securely tightened again.

Intermediate Frequency Adjustments

The intermediate frequency used in these receivers is 455 kilocycles. Because of the necessity of obtaining the proper shape of resonance curve of these stages in a high fidelity receiver, it is recommended that unless it is absolutely essential, these I. F. adjustments be untouched. In the factory these adjustments are made using a visual system which allows the operator to see the exact shape of the resonance curve. For this reason it is best to have these adjustments made at the factory. However, in the case where this cannot be done, the following procedure should be followed.

1. Push in the push button which is located under the designation, "Manual On". Operate the Range Switch of the receiver to the Standard Broadcast range position, and set the tuning dial pointer to its extreme low frequency position. Set the Treble control knob and the Bass control knob to their normal positions.

CAUTION: Never attempt to align the R. F. or I. F. circuits of this receiver with the Treble control knob set at any position other than the "Normal" position. Also, do not make any aligning adjustments of the R. F., I. F., or "Discriminator" circuits with any push button other than the one located under the designation "Manual On" pushed in.

2. Apply between the chassis base (or ground binding post) of the receiver and the grid of the No. 6A8 modulator tube, a modulated signal of 455 kilocycles from the signal generator, using a 0.1 mfd. capacitor in series with the connection between the output terminal of the signal generator and the grid of the No. 6A8 tube. Do not remove the chassis grid lead connecting to this tube. The ground (or low side) terminal of the signal generator should be connected to either the chassis base or the ground binding post.
3. Now, noting from Figure 1, the alignment adjustments for the First, Second, and Third I. F.-Discriminator transformers, align the I. F. circuits in the following order:

Secondary of Third I. F.-Discriminator transformer for maximum output.
Primary of Third I. F.-Discriminator transformer for maximum output.
Secondary of Second I. F. transformer for maximum output.
Primary of Second I. F. transformer for maximum output.
Secondary of First I. F. transformer for maximum output.
Primary of First I. F. transformer for maximum output.

Carefully make all of the above adjustments, watching the output meter so that the peak reading is obtained for each adjustment. As each adjustment is made reduce the output of the test oscillator as required.

Adjustment of the Discriminator Circuit

1. Before making this circuit adjustment be sure that the I. F. amplifier and signal generator are exactly in resonance at 455 kilocycles.
All controls should be set the same as instructed for the intermediate frequency adjustments. Connect a high resistance voltmeter having a resistance of at least 1000 ohms per volt across the capacitor, C-79. The signal generator should remain connected to the grid of the No. 6A8 modulator tube in the same manner as connected when making the aligning adjustments of the intermediate frequency amplifier

circuits. The signal generator's output control should be adjusted so that a signal of 10,000 microvolts is fed into the modulator tube. Under these conditions the voltmeter connected across the capacitor, C-79, should read zero.

If the above conditions are not obtained, the signal generator should be set to exact resonance with the intermediate frequency amplifier (455 kilocycles) as mentioned in 1 above, and the secondary adjustment of the Third I. F.-Discriminator transformer should be rotated so zero voltage is indicated on the voltmeter connected across the capacitor, C-79.

Now, adjust the signal generator's frequency a slight amount (approximately 5 kilocycles) each side of 455 kilocycles, noting at the same time the reading of the voltmeter; a decrease in the signal generator's frequency (from 455 kilocycles) should make the voltmeter give an increased reading from zero and an increase in the signal generator's frequency (455 kilocycles) should make the voltmeter give a decreased indication from zero.

Radio Frequency Adjustments

The alignment of the radio frequency circuits in these receivers should be very carefully made and in the order specified.

When making any aligning adjustments of these circuits, all controls, with the exception of the "Manual Stations" control, should be set at the positions mentioned for the Intermediate Frequency adjustments.

Alignment of 11 to 22 Megacycles Short Wave Range (Referred to as "D" Range)

In aligning the radio frequency circuits for this range, replace the 0.1-microfarad capacitor which was placed in series with the test oscillator's output lead for the I. F. alignments, with a 400-ohm carbon type resistor. This lead should then be connected to the antenna binding post located on the rear of the receiver chassis. The ground terminal (or low side) of the test oscillator should be connected to the ground binding post on the receiver.

1. Operate the Range Switch on the receiver chassis to the 11 to 22 megacycles short wave ("D") range position, and set the test oscillator's frequency and the receiver's tuning dial pointer to 20 megacycles.
2. Adjust the receiver's oscillator "D" range H. F. (high frequency) aligner for maximum output.
3. Adjust the R. F. interstage "D" range H. F. aligner for maximum output.
4. Adjust the antenna "D" range H. F. aligner for maximum output.
5. Set the test oscillator's frequency and the receiver's tuning dial pointer to 11 megacycles.
6. Adjust the receiver's oscillator "D" range L. F. (low frequency) aligner for maximum output.
7. Adjust the R. F. interstage "D" range L. F. aligner for maximum output.
8. Adjust the antenna "D" range L. F. aligner for maximum output.
9. Reset both the test oscillator's frequency and the receiver's tuning dial pointer to 20 megacycles and repeat operations Nos. 2, 3, and 4.

Alignment of 4.8 to 11 Megacycles Short Wave Range (Referred to as "C" Range)

In aligning the radio frequency circuits for this range, use the same artificial antenna (400-ohm carbon type resistor) in series with the output terminal of the test oscillator as was used for aligning the short-wave range.

1. Operate the Range Switch on the receiver chassis to the 4.8 to 11 megacycles short wave ("C") range position, and set the test oscillator's frequency and the receiver's tuning dial pointer to 10 megacycles.
2. Adjust the receiver's oscillator "C" range H. F. aligner for maximum output.
3. Adjust the R. F. interstage "C" range H. F. aligner for maximum output.
4. Adjust the antenna "C" range H. F. aligner for maximum output.
5. Set the test oscillator's frequency and the receiver's tuning dial pointer to 5 megacycles.
6. Adjust the receiver's oscillator "C" range L. F. aligner for maximum output.
7. Adjust the R. F. interstage "C" range L. F. aligner for maximum output.
8. Adjust the antenna "C" range L. F. aligner for maximum output.
9. Reset both the test oscillator's frequency and the receiver's tuning dial pointer to 10 megacycles and repeat operations Nos. 2, 3, and 4.

Alignment of Medium Wave Range (Referred to as "B" Range)

In aligning the radio frequency circuits for this range, use the same artificial antenna (400-ohm carbon type resistor) in series with the output terminal of the test oscillator as was used for aligning the short wave ranges.

1. Operate the Range Switch on the receiver chassis to the Medium Wave ("B") range position, and set the test oscillator's frequency and the receiver's tuning dial pointer to 4.5 megacycles.
2. Adjust the receiver's oscillator "B" range H. F. aligner for maximum output.
3. Adjust the R. F. interstage "B" range H. F. aligner for maximum output.
4. Adjust the antenna "B" range H. F. aligner for maximum output.
5. Set the test oscillator's frequency and the receiver's tuning dial pointer to 1.8 megacycles.
6. Adjust the receiver's oscillator "B" range L. F. aligner for maximum output.
7. Reset both the test oscillator's frequency and the receiver's tuning dial pointer to 1.4 megacycles and repeat operations Nos. 2, 3, and 4.

Alignment of Standard Broadcast Range (Referred to as "A" Range)

In aligning the radio frequency circuits for this range, replace the 400-ohm carbon type resistor in series with the test oscillator's output lead with a 200-micro-microfarad capacitor and align these circuits as follows:

1. Operate the Range Switch on the receiver chassis to the Standard Broadcast ("A") range position and set the test oscillator's frequency and the receiver's tuning dial pointer to 1.5 megacycles.
2. Adjust the receiver's oscillator "A" range H. F. aligner for maximum output.
3. Adjust the R. F. interstage "A" range H. F. aligner for maximum output.
4. Adjust the Bi-Resonator's aligner for maximum output.
5. Adjust the antenna's "A" range H. F. aligner for maximum output.
6. Set the test oscillator's frequency and the receiver's tuning dial pointer to 0.6 megacycles.
7. Adjust the receiver's oscillator "A" range L. F. aligner for maximum output.
8. Reset both the test oscillator's frequency and receiver's tuning dial pointer to 1.5 megacycles and repeat operations Nos. 2, 3, 4, and 5.

Adjustment of 10 Kilocycle Audio Cut-Off Filter

The adjustment of this filter is correctly made at the factory and no additional adjustment is required.

INSTRUCTIONS FOR SETTING UP ELECTRIC TUNING SYSTEM

1. Before proceeding with setting up the eight favorite broadcast stations for electric tuning, it is preferable that the radio receiver be turned "on" for approximately twenty minutes. This is accomplished by simply pushing in the push button immediately below the designation, "Manual On" (indicated by illumination of the dial).
2. Check the position of the "Treble" control knob. When setting up or tuning in stations, this control knob should be set at the "Normal" position (pointer on knob pointing in direction of gold dot).
3. Set the Range switch control knob to the "Broadcast" position (pointer on knob pointing in direction of gold dot).
4. Remove the lists of station letters from the P-28781 package assembly which is tacked inside of the cabinet.
5. Remove the three screws which hold the electric tuning escutcheon plate (metal plate) to the electric tuning escutcheon. Then, remove from the escutcheon, the strip of transparent material and the strip of paper on which the eight stars are printed.
6. From the lists of stations, remove the call letters of the eight stations which it is desired to set up for electric tuning. These eight stations should preferably be selected and set up in the daytime so that the best service will be obtained at all times.

CAUTION: When setting up these stations it is necessary to see that the separation of these stations on the dial is sufficient to allow adjacent "Adjustable Station Brushes" to be properly located in the adjusting slot.

It will be noted that the station letters are printed on partially cut squares to facilitate ease in removing the desired station letters. In setting up these eight favorite stations, the following order should be followed:

Looking at the front of the receiver, the station letters of the station having the highest frequency should be inserted into the farthest left-hand square of the escutcheon. Then, in successive order, according to the frequency, insert the station letters of the remaining seven stations into the other seven squares of the electric tuning escutcheon; the station letters of the station having the lowest frequency being inserted into the farthest right-hand square of the escutcheon.

After the eight station call letters have been inserted into the escutcheon, the transparent strip should be replaced over the station call letters, and the escutcheon plate then fastened into its position on the electric tuning escutcheon by means of the three screws.

The tuning adjustments for the eight favorite stations can now be made, starting with the station having the highest frequency and proceeding as follows:

7. With the Range switch control knob set to the "Broadcast" position, and the "Manual On" button pushed in, tune the receiver in the conventional manner by means of the "Manual Stations" (Station Selector) control knob to that station having the highest frequency.
IMPORTANT: When manually tuning in a station, or when setting up a station in the electric tuning system, exact resonance with the desired station should always be obtained by observing the tuning indicator.
8. Facing the rear of the receiver, it will be observed that the commutator assembly located on the rear of the gang tuning capacitor has a calibrated dial and dial pointer. After manually tuning in the favorite broadcast station as mentioned in paragraph 7 above, it will be seen that the commutator dial's pointer also indicates the frequency of the station; now, slide the "Adjustable Station Brush" (which is nearest to the high frequency end of the commutator dial) in the slot until it is directly in line (and centered) with the end of the commutator's dial pointer.
9. Now, in successive order, according to frequency, proceed to set up the remaining seven favorite stations in the same manner as was mentioned in paragraphs 7 and 8 above for the favorite station having the highest frequency.
When the eight adjustable station brushes have all been set up for the eight stations, the brush nearest to the low frequency end of the commutator's dial should be set at the frequency of the station having the lowest frequency.

10. After the eight favorite stations' brushes have all been positioned in the commutator's slot as mentioned in paragraphs 7, 8, and 9 above, loosen about one turn, the clamping screw of the tuning indicator. Remove the tuning indicator unit (with its clamp) from its metal bracket and allow the unit to rest on the chassis base with the end of the tuning indicator tube facing the rear of the receiver.
11. Repeat the operation mentioned in paragraph 7 above, for the favorite station having the highest frequency, being careful to obtain exact resonance with this station by means of the tuning indicator. When resonance with this station is obtained, watch the aperture appearing on the target of the tuning indicator tube and push in the button which is located under the station's letters (dial illumination ceases and station letters become illuminated). If the aperture of the tuning indicator changes, move the adjustable station brush slightly in either direction and recheck for resonance by switching back to manual tuning. Repeat this process until the condition is obtained where there is no change in the aperture of the tuning indicator tube when the station is switched from manual to electric tuning.
12. Proceed to check the settings of the adjustable station brushes for the remaining seven chosen stations according to frequency in exactly the same manner as mentioned in 11, above.

When this has been accomplished, again mount the tuning indicator unit into its proper operating position. This completes the operations necessary for setting up the eight favorite stations.

IMPORTANT: With the electric tuning system in operation, the receiver will be automatically kept in tune with any one of the eight favorite stations as long as the station is operating or provided it has no unusual fading characteristics. If a distant station which is very weak is set up in the electric tuning unit, it will be found that the automatic frequency control circuit will not hold this station if a strong signal is present in either adjacent channel. This same phenomenon will occur if two stations in adjacent channels are almost of equal signal strength with the weakest signal fading slightly; with this condition the strong signal will have a tendency to "pull in" when the receiver is tuned to the station which is slightly weaker and fading.

REMOTE TUNING CONTROL

Stromberg-Carlson has prepared a "Remote Tuning Control Unit" which may be easily installed on these receivers by your dealer or service man. The use of this unit enables one to select any one of the eight favorite stations which have been set up in the electric tuning system at a distance from the receiver, up to the length of the attachment cable. In addition to the push buttons for the control of the eight favorite stations, two push buttons are also included for controlling the volume.

These units, with all accessories and instructions, are available as complete package assemblies. There are two different package assemblies; P-29581 package assembly which is for use on these receivers designed for operation on a power supply having a frequency of 50 to 60 cycles, and P-29872 package assembly which is for use on these receivers designed for operation on a power supply having a frequency of 25 cycles.

OBTAINING REPRODUCTION FROM PHONOGRAPH RECORDS

These receivers are equipped with a three-contact phonograph socket located in the center of the metal shield which covers the push button switches and is visible from the rear of the receiver. A three-prong plug is also furnished for connecting the pick-up cable to the phonograph socket.

To obtain the best quality of phonograph reproduction from these receivers, a Stromberg-Carlson Record Player is recommended. The Record Player is equipped with a correctly designed single record playing motor unit, and uses a crystal type pick-up in conjunction with a specially equalized circuit.

To switch the radio receiver's circuits from radio reproduction to phonograph reproduction, it is only necessary to push in the push button located under the designation, "Phono On". The Record Player's turntable switch should then be pushed to the "on" position. When the turntable has attained speed, raise the pick-up and lower it gently on to the record so that the needle point enters the outside groove. The volume and the bass response for phonograph reproduction can be controlled the same as for radio reception, i. e., by means of the "VOLUME" and "BASS" control knobs located on the front panel of the radio receiver. The treble response may also be varied by means of the control marked "TREBLE", which is located on the front panel of the radio receiver. However, when operating the phonograph unit this "TREBLE" control is effective only between the "NORMAL" position and its maximum counter-clockwise position; rotating this control knob in a clockwise direction from the normal position will not produce any change in the tone of the phonograph reproduction.

If the Stromberg-Carlson Record Player is not used and the electric pick-up to be used is of the high impedance type, it will be necessary to connect a shielded cable between the three-prong plug and the pick-up. For best reproduction, this shielded cable should be of the low capacity type. The length of this shielded cable should be kept as short as possible. To connect the shielded cable to the three-prong plug, remove the metal cover of the plug and solder the shield of the cable to that prong which is farthest away from the other two prongs; a short connecting wire must also be soldered from this prong to the upper right-hand prong when looking at the rear of the plug, that is, the side opposite to the prong side. The inside wire conductor of the shielded cable should then be soldered to the other terminal of the plug.

If a pick-up of the low impedance type is used, it will be necessary to connect a "matching transformer" between the three-prong plug and the pick-up. The transformer should be located as near to the receiver as possible, in which case it will not be necessary to use a shielded cable.

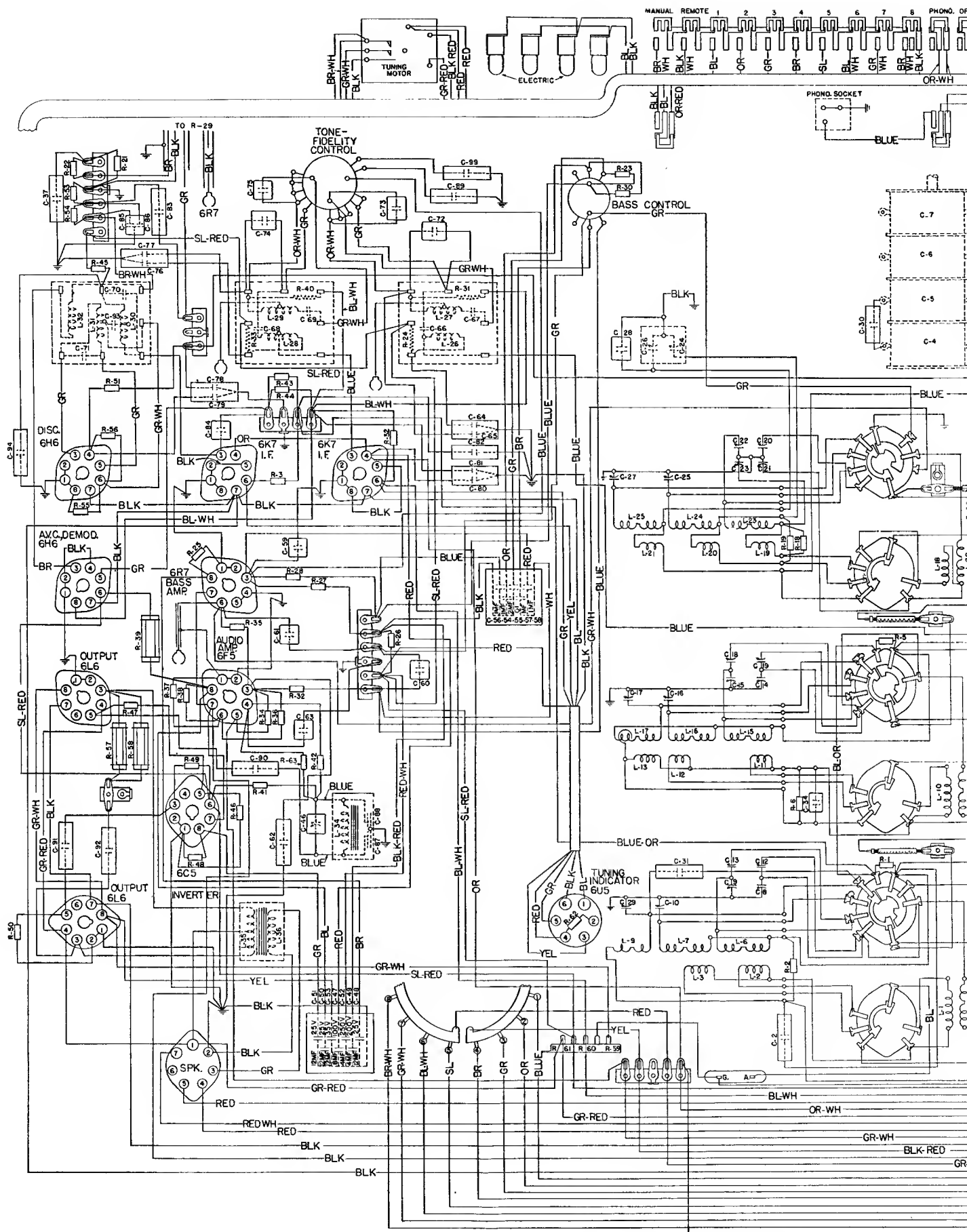


Fig. 3. Wiring Diagram of Chassis.

REPLACEMENT PARTS

| Piece Number | Circuit Designation | Part |
|--------------|--|---|
| 22988 | . | Socket, 4 Prong |
| 23517 | . | Socket, 7 Prong |
| 24314 | C3 | Capacitor, Type O, 10 Mmfd. |
| 24402 | C39, C89 | Capacitor, .1 Mfd. |
| 24405 | C1, C38, C82, C83, C91 | Capacitor, .04 Mfd. |
| 24560 | C84 | Capacitor, Type O, 50 Mmfd. |
| 24994 | C94 | Capacitor, .05 Mfd. |
| 25149 | C31, C42 | Capacitor, .01 Mfd. |
| 25150 | C90 | Capacitor, .02 Mfd. |
| 25156 | . | Fuse, 3 Amperes |
| 25487 | C43 | Capacitor, Type W, .001 Mfd. |
| 25526 | R16, R17 | Resistor, Type F, 15,000 Ohms |
| 25535 | C60 | Capacitor, Type 3, .008 Mfd. |
| 25539 | . | Socket, 8 Prong |
| 26062 | R15 | Resistor, Type F, 10,000 Ohms |
| 26151 | C92 | Capacitor, .005 Mfd. |
| 26322 | R20 | Resistor, Type E, 120 Ohms |
| 26323 | R38 | Resistor, Type E, 150 Ohms |
| 26333 | R4, R12, R24, R33, R45 | Resistor, Type E, 1000 Ohms |
| 26335 | R22 | Resistor, Type E, 1500 Ohms |
| 26337 | R19, R37 | Resistor, Type E, 2200 Ohms |
| 26339 | R27 | Resistor, Type E, 33,000 Ohms |
| 26340 | R18, R28 | Resistor, Type E, 3900 Ohms |
| 26343 | R48 | Resistor, Type E, 6800 Ohms |
| 26345 | R14, R21, R25, R26 | Resistor, Type E, 10,000 Ohms |
| 26350 | R54 | Resistor, Type E, 27,000 Ohms |
| 26353 | R6, R13, R34, R41 | Resistor, Type E, 47,000 Ohms |
| 26357 | R2, R31, R32, R40, R42, R46 | Resistor, Type E, .1 Megohm |
| 26362 | R23, R30, R35, R47, R50, R52, R53, R63 | Resistor, Type E, .27 Megohm |
| 26365 | R8, R36, R55, R56 | Resistor, Type E, .47 Megohm |
| 26369 | R43, R44 | Resistor, Type E, 1 Megohm |
| 26373 | R3, R51 | Resistor, Type E, 2.2 Megohm |
| 26383 | R1, R5 | Resistor, Type E, 100,000 Ohms |
| 26497 | . | Tuning Indicator Cable Assembly |
| 26512 | C85, C86, C87, C88 | Capacitor, Type WD (2-100 Mmfd.) |
| 26567 | R39, R57, R58 | Resistor, Type F, 30,000 Ohms |
| 26568 | C46 | Adjustable Capacitor, High Frequency Cut-Off Filter |
| 26677 | . | Phono Socket Plug |
| 26678 | . | Phono Socket |
| 26778 | C59, C61 | Capacitor, Type W, .005 Mfd. |
| 27101 | C34, C40, C63 | Capacitor, Type O, 200 Mmfd. |
| 27108 | C32, C33, C35, C36, C64, C65, C76, C77, C78, C79, C80, C81 | Capacitor (2-.05 Mfd.) |
| 27305 | C93 | Capacitor, 50 Mmfd. |
| 27407 | R11 | Resistor, Type EB, 22,000 Ohms |
| 27588 | C8, C9, C10, C12, C13, C29 | H. F. and L. F. Aligning Capacitors |
| 27589 | C14, C15, C16, C17, C18, C19 | H. F. and L. F. Aligning Capacitors |
| 27610 | R29 | Volume Control |
| 27643 | L1, L5 | Antenna Transformer, "D" Range |
| 27644 | L10, L14 | R. F. Transformer, "D" Range |
| 27645 | L18, L22 | Oscillator Transformer, "D" Range |
| 27753 | C97, C98 | Electrolytic Capacitor, 8 Mfd., 500 Volts |
| 27754 | C96 | Electrolytic Capacitor, 16 Mfd., 480 Volts |
| 27755 | C95 | Electrolytic Capacitor, 16 Mfd., 350 Volts |
| 27756 | C45 | Electrolytic Capacitor, 16 Mfd., 300 Volts |
| 27761 | R7 | Resistor, Type E, 620 Ohms |
| 27764 | R59, R60, R61 | Resistor, "B" Voltage Divider |
| 27765 | L35, L36 | Output Transformer |
| 27767 | L39 | "B" Choke Assembly |
| 27773 | . | Fidelity Control Switch |
| 27782 | C2, C99 | Capacitor, .03 Mfd. |
| 27882 | C11 | H. F. Aligner, Antenna Transformer |
| 28002 | C37, C62 | Capacitor, .25 Mfd. |
| 28025 | . | Pilot Lamp |
| 28034 | C20, C21, C22, C23, C25, C27 | H. F. and L. F. Aligning Capacitors |
| 28174 | R10 | Resistor, Type EB, 27,000 Ohms |
| 28652 | . | Cord (Power Supply) |
| 29012 | C70, C71 | Capacitor, 100 Mmfd. |
| 29064 | C28 | Fixed Mica Capacitor, 200 Mmfd. |
| 29092 | C44 | Capacitor, Type O, 50 Mmfd. |
| 29161 | . | Commutator Assembly for Electric Tuning Selector |
| 29189 | . | Remote Control Socket |
| 29210 | L30, L31, L32 | Third I. F. and Discriminator Transformer |
| 29211 | C67, C69 | Capacitor, 300 Mmfd. |
| 29216 | C4, C5, C6, C7 | Gang Tuning Capacitors Assembly |
| 29219 | . | Flexible Coupling for Gang Tuning Capacitor |
| 29233 | . | Motor for Electric Tuning (50-60 Cycles Chassis Only) |

REPLACEMENT PARTS—Continued

| Piece Number | Circuit Designation | Part |
|--------------|-----------------------------------|---|
| 29242 | . | Tuning Drive Pulley |
| 29248 | . | Pulley for Dial Pointer's Slider |
| 29253 | . | Pulley for Range Switch Shaft |
| 29266 | . | Bronze Wire Cable for Pointer's Slider |
| 29277 | . | Pilot Lamp Sockets Assembly for Station Letters |
| 29278 | . | Pilot Lamp Sockets Assembly for Push Buttons |
| 29279 | . | Pilot Lamp Socket Assembly for Tuning Dial |
| 29280 | . | Bass Control Switch |
| 29285 | C72, C73, C74, C75 | Capacitor, Type W, .006 Mfd. |
| 29288 | . | Electric Tuning Cable Assembly |
| 29312 | L40, L41, L42, L43 | Power Transformer (50 to 60 Cycles Chassis) |
| 29313 | L40, L41, L42, L43 | Power Transformer (25 to 60 Cycles Chassis) |
| 29314 | . | Range Switch |
| 29315 | L2, L3, L6, L7, L9 | Bi-Resonator Coil "A" Range, Antenna Transformer "B" and "C" Ranges |
| 29316 | L11, L12, L13, L15, L16, L17 | R. F. Transformer, "A", "B" and "C" Ranges |
| 29317 | L19, L20, L21, L23, L24, L25 | Oscillator Transformer, "A", "B" and "C" Ranges |
| 29319 | L4, L8 | Antenna Transformer, "A" Range |
| 29320 | L26, L27 | First I. F. Transformer |
| 29321 | L28, L29 | Second I. F. Transformer |
| 29326 | L34 | High Frequency Cut-Off Filter Assembly |
| 29328 | . | Dial |
| 29332 | C66, C68 | Capacitor, 300 Mmfd. |
| 29333 | C54, C55, C56, C57, C58 | Capacitor Assembly |
| 29334 | C47, C48, C49, C50, C51, C52, C53 | Capacitor Assembly |
| 29337 | C24, C26 | L. F. Aligning Capacitors |
| 29357 | R9 | Resistor, Type EB, 1500 Ohms |
| 29358 | R46 | Resistor, Type EB, 18,000 Ohms |
| 29359 | C41 | Capacitor, Type O, 75 Mmfd. |
| 29627 | . | Spring for Range Indicator |
| 29628 | . | Spring for Tuning Drive Cord |
| 29633 | . | Dial Pointer and Slider Assembly |
| 29714 | . | Motor for Electric Tuning (25 Cycles Chassis Only) |
| 29727 | . | Spring for Bronze Wire Cable (2 Required) |

MISCELLANEOUS PARTS

| Piece Number | Part |
|--------------|--|
| 27628 | Felt Washer (one required between each Control Knob and Cabinet) |
| 27800 | Knob. Used on "Volume" and "Manual Stations" Control Shafts |
| 27801 | Knob. Used on "Treble", "Bass" and "Ranges" Control Shafts |
| | Black Cord for Tuning Drive |